Intensive Agriculture

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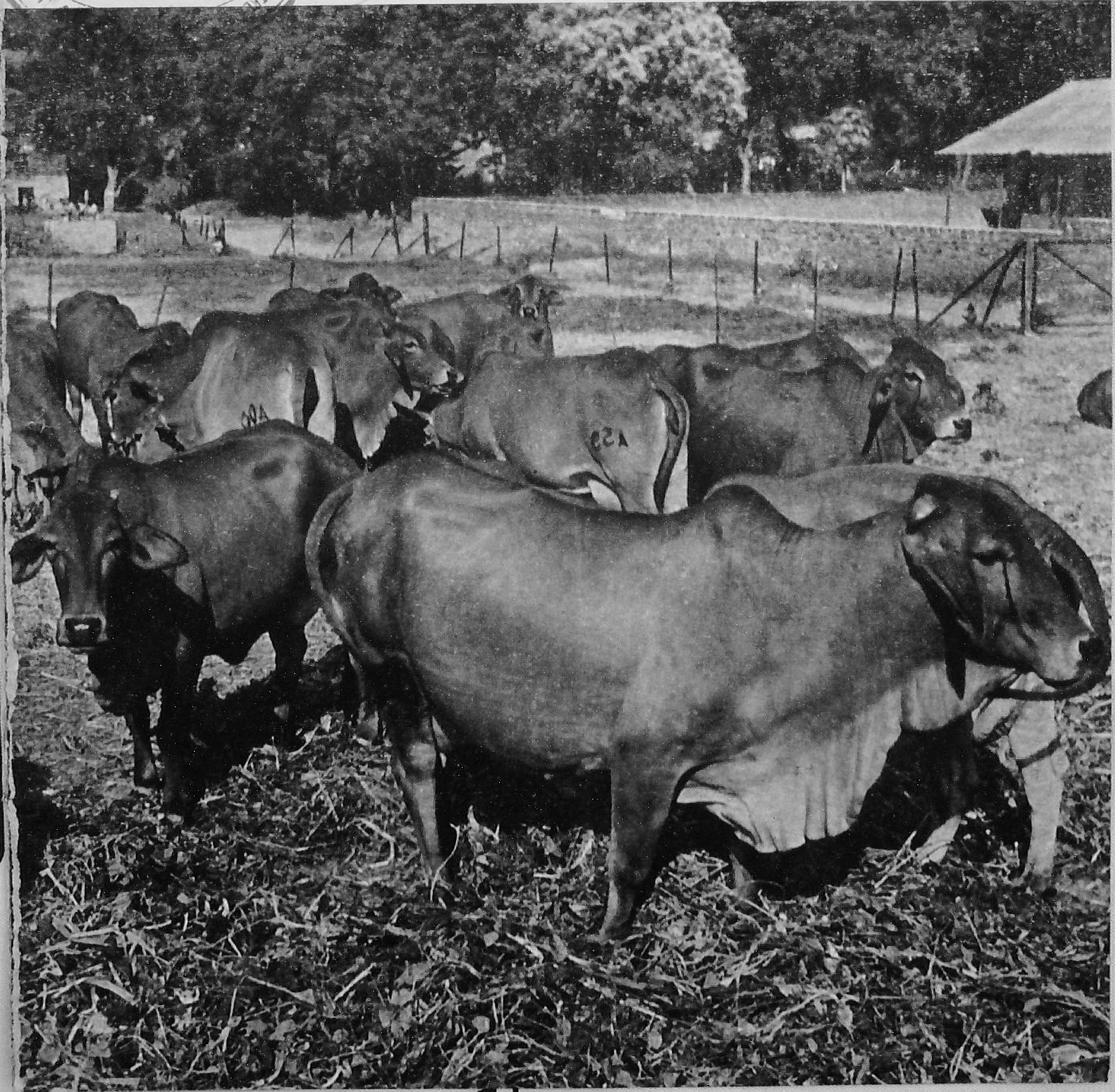

Jute being harvested

Intensive Agriculture

VOLUME 1. No. 7 SEPTEMBER 1963

THE PICTURE ON THE COVER

Who would not like to possess a herd like this ? But healthy cattle should have good feed. Here *Gajraj*, a new fodder grass can solve a common feed-problem. For full story, turn to page 14.

(Cover Pictures Courtesy ICAR)

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New Delhi

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Taking Wheat Yields Up

Not just one but a combination of several factors go to determine the increase in wheat yields

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By

T. R. MEHTA

Director, Farm Advisory Unit

Directorate of Extension, New Delhi

THE wheat yields you get depend mainly on how you implement the following five steps.

- Increased use of fertilizers
- Improved crop varieties capable of producing higher yields
- Conservation and controlled use of water
- Improved cultural methods, including crop rotation
- Control of pests, diseases and weeds

Any programme which aims at increasing the yield of the wheat crop must, therefore, be based upon all or most of these factors.

FERTILIZERS FOR IMMEDIATE INCREASE

Low yields are mostly the result of the low fertility of the soil. There is too little manure available or which can be made available, to meet the needs of crops for high, sustained yields. Therefore, we must give high priority to fertilizer use while continuing our emphasis on green manuring, compost, etc. It is the increased use of fertilizer which offers the brightest prospect for an immediate increase in yield.

Well-manured and fertilized fields can easily yield four to five times the national average. We, therefore, need millions of more farmers to use judicious doses of fertilizers on wheat. To achieve this, it will be necessary to intensify Extension efforts, so that many more fertilizer demonstrations on wheat can be held in the next few years. This is specially necessary in irrigated areas where farmers can increase their yields two to threefolds.

SUITABLE VARIETIES

But fertilizer-use has to go side by side with the growing of varieties which respond most profitably to the fertilizer application. For where the varieties are susceptible to rust, the better conditions of growth created through irrigation and fertilizer application have often led to a greater incidence of rust, with the result that farmers become reluctant to improve their cultivation practices.

This was specially evident in the important wheat region of central India, the Narbada valley, until the new wheat hybrids, *Hyb. 11* and *Hyb. 65,* demonstrated that a lush growth of wheat can go with freedom from rust. There are now available a large number of varieties which are not only resistent to rust but which also respond well to fertilizer application.

But many farmers are still hesitant for they feel higher doses of fertilizers cause lodging in these varieties. To them, the straw strength in wheat is their problem No. 1. The Indian Agriculture Research Institute, New Delhi, has some very promising varieties which are of a low height but at the same time can give high grain yields because of heavy tillering. Among the varieties with normal height many farmers would recall the old Punjab variety *C 518*. Among the new varieties which respond well

to heavy manuring and have a good straw strength are *NP 839, NP 852, NP 862* and *NP 876*. *Punjab C 273* is another variety which deserves mention in this respect.

ENOUGH SOIL MOISTURE

Another factor which results in low wheat yields is insufficient soil moisture during the growth period of the crop, specially during the maturity period. In many areas, wheat is grown without irrigation or with scanty irrigation, with the result that the crop suffers because of dry warm weather between the milk stage and maturity. This results in shrivelling of the grain and reduction in yield.

It is, therefore, necessary to breed varieties which are either drought-resistant or which mature sufficiently early to escape the desicating effect of drought. Some varieties like *NP 851, K 68* and *C 303* indicate resistance while others like *RS 31-1, NP 797, NP 798, NP 799* and *NP 852* have a capacity for a rapid grain maturity. But these varieties are yet to be tried in different regions to decide which varieties are more suitable for a particular area.

NO DELAY IN SOWING

Delay in sowing is yet one more factor which is responsible for low yields of wheat. This may be due to many reasons but all the same it does affect the yield.

NP 835, NP 852, NP 880 and *C 281* could be considered as suitable varieties for late sowing. In some districts of Bihar, *NP 798* has already gained popularity because it also shows early maturity but it may have to give place to the newer varieties like *NP 852*.

A variety may be very good for late sowing in a particular area but may not be good in another area. It is necessary to discover the most suitable time for sowing each variety in each area.

PROFITABLE ROTATIONS

Much more remains to be done in this respect than what is being attempted today. Many farmers still continue to practise very exhaustive rotations with wheat. Whereas in many wheat areas, such as in western Uttar Pradesh, legumes like field peas and berseem are commonly rotated with wheat in irrigated areas, the legumes excepting table peas for the paying vegetable market offered by the city of Delhi, do not find a prominent place in the neighbouring villages of Delhi, where they are hardly grown.

Extension efforts in a certain village near Delhi demonstrated the efficacy of cowpea-wheat rotation in 1960-61 so well that the very next year no double-cropped field where wheat follows green fodder was sown to *jowar* (for fodder). The entire area was sown to cowpea. The secret of success of cowpea-wheat rotation was a liberal application of superphosphate to the cowpea crop, harvesting of the green cowpea fodder a little above the ground level to enable the farmer get more than one cutting of the green fodder and ploughing in the last growth so that it serves as green manure and helps also in making the residual phosphate become available to the wheat crop. The wheat yields in the area went up very considerably.

Unfortunately legumes do not give as profitable yields as many of the more exhaustive crops give. Research work is going on to evolve more profitable legume varieties and crops. Thus field pea *Type 163* of U.P. has greatly helped improve soil fertility. It is popular because under certain situations, such as late sowing, it gives more food and more money than wheat to the farmer. Similarly, berseem gives more money through better milk yields and better yields of crops which come in rotation, and is, therefore, gaining popularity in many areas.

WAR ON WEEDS

The need for control of weeds in wheat is no less important. While experiments on weed control through chemicals have given very encouraging results, it will be some time before they are sufficiently popularized. Till then mechanical methods have to be used.

Simple hand-hoes like the I.A.R.I. hoe and the Sharma hoe are very useful tools. In many villages where weeding of wheat was not done in the past (because the only known way to do it was with a *khurpi* which made the work too slow and back-breaking), the introduction of Sharma hoe has made weeding very common.

If all these steps are implemented by all our wheat farmers, the wheat yields will no longer remain low.

THE GRASS THAT PUT HIM IN THE NEWS

By LAL KARAMCHANDANI

It was not long ago that Bhagwatji, a 30-year old farmer of Chandanhola village, about 15 miles from Delhi, had had the experience of being the laughing stock of not only his village, but of neighbouring ones also.

For according to his neighbours, was he not a fool to have readily agreed to change over to a new grass instead of sticking on to sure *bajra* and *jowar* just because some officials from the Directorate of Extension, Ministry of Food and Agriculture, had suggested it ? How could he have agreed to it when he as well as other villagers knew that no grass could come up during the hot summer days ?

But now all this seems very very long ago. The whole village has changed opinion for it has seen that he has grown a grass which yields every day from one-fifth of an acre not only enough fodder to feed his six head of cattle but also enough to spare, which was just not possible with any other fodder grass in summer.

And no longer is his mother bitter against the Extension officials, as she was before, for she has seen with her own eyes how a grass grown in a small piece of land has brought prosperity to the whole family and fame to her son, Bhagwatji.

All this was amply evident when we visited this farmer a few days back, from the radiant smiles of the

The crop that was ten feet tall !

farmer to the blessings by the mother, from the anxious enquiries by other villagers to the well-fed and healthy cattle which were feeding on this grass.

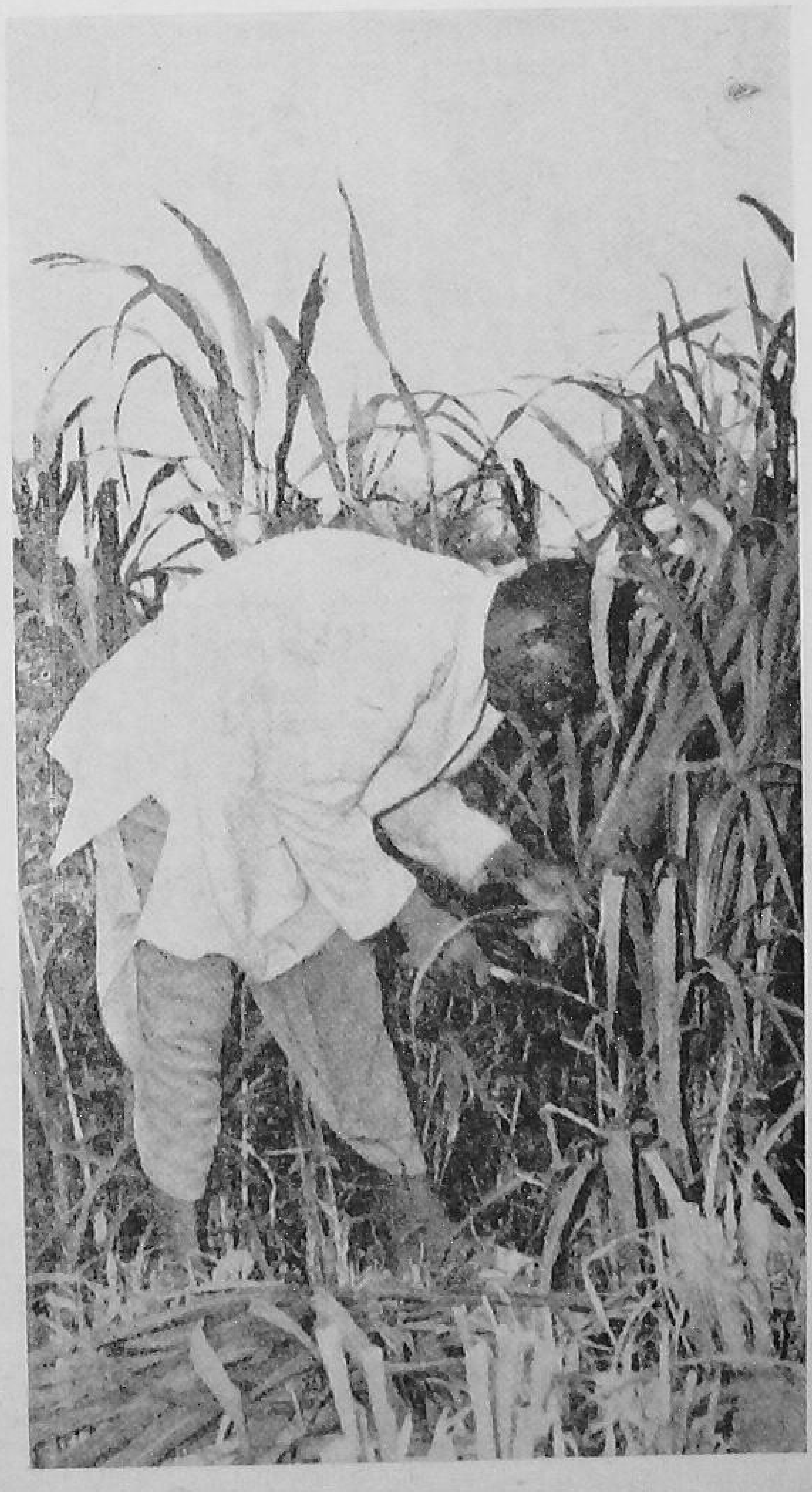
How all this came about makes an interesting as well as an instructive story of what Extension service can do in our villages.

THE NEW GRASS

The grass which Bhagwatji grew came into being out of the union of Napier grass (also known as Elephant grass) and *bajra* at the Indian Agricultural Research Institute, New Delhi, recently. The grass was given the name of Pusa Giant Napier grass.

The Pusa Giant Napier grass is more versatile than either Napier grass or *bajra,* its parents. In summer when the conditions are dry, it shows the qualities of *bajra* which is a dry tract crop; and in monsoon that of Napier grass which is a water-loving crop. Therefore, almost the whole year, one can get cuttings

Two to three maunds of cuttings every day and that too when no other fodder grass is available



from Pusa Giant Napier grass. It is also more nutritious ($1\frac{1}{2}$ times richer in protein) and more palatable (more sugar-content) than Napier grass. That is why cattle relish it more.

Farmer Bhagwatji, who owns 40 *bighas,* gave one *bigha* to the growing of Pusa Giant Napier grass. He planted 2,500 cuttings (weighing about three maunds) which were given to him by the Extension people. He planted the cuttings $2\frac{1}{2}$ feet apart and in lines.

Before planting, he had put a truckload of Okhla sludge and had also given four hoeings to the land.

He irrigated the land immediately after planting. In the hot dry summer, he irrigated the field once every ten days from a well, located nearby.

As regards fertilizers, he gave a basal dose of 20 seers of superphosphate and 10 seers of ammonium sulphate. The crop grew thick and fast to about eight to ten feet high.

GREEN FODDER EVERY DAY

Farmer Bhagwatji does not take all the cuttings at one time. He takes fresh cuttings every day to feed his cattle. In the beginning, he was getting about 10 to 15 seers a day and still a bigger yield, during the monsoon. Now-a-days, he gets two to three maunds. He starts taking cuttings from one end of the land and slowly proceeds towards the other. By the time he reaches the other end, the crop has grown again at the first end. This way, he gets a continuous good supply of green and fresh fodder every day.

GOOD DIVIDENDS

By now, he has already harvested over 150 maunds of the green matter. He is expecting a minimum of another 400 maunds from his one-*bigha* plot. This works out to about 2,750 maunds, from an acre—a pretty good yield considering that apart from its high yield, the grass grows practically all the year round, excepting during the months of November to January.

He has one buffalo, two cows, two calves and one bull. He used to feed them with 20 seers of *bhusa* every day. Now, he need give only five or six seers of it, because Pusa Giant Napier grass goes to make up for the rest of the ration. This way, he saves four to five rupees every day. This is a pretty good return from just one *bigha.*

No wonder Bhagwatji is now considered wise by other villagers for having changed over to this new grass on the advice of Extension officials.

For they have seen for themselves that by taking to Pusa Giant Napier grass, one can get green fodder almost all-the-year round (including hot summer days) and what's more very high yields in the bargain!

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Pay LENTIL a little more attention

Five steps to make lentil give better results

By

G. S. DEEPAK and A. S. SANDHU

GROWING only an improved variety, using a higher seed-rate, sowing at the right time, adding superphosphate and controlling weeds are the key points for raising a good lentil crop. These steps, already followed by a few progressive farmers in the Punjab, should be taken up by all lentil growers of the State, if they want very good results from their lentil crop.

One need not work hard for preparing the seed-bed for lentil crop. Only two ploughings after harvesting the *kharif* crop will be sufficient.

There is only one variety of lentil you should sow in the Punjab. It is *No. 9-12*. It is a very good variety and branches profusely.

It outyields local varieties by 30 to 50 kilograms per acre.

It possesses good cooking quality. The density of its soup and the increase in volume on cooking are also greater than in the local varieties.

Although it can be grown any time from the end of September to the middle of December, the sowings in November give best results.

The crop should be sown early in *barani* areas. Its sowing can, however, be done even later in irrigated lands.

Normally no manuring is done to this crop. However, applying 100 to 125 kilograms of superphosphate per acre is beneficial.

Superphosphate should be drilled at the sowing time.

If superphosphate is to be drilled at the sowing time, the seed may be sown by *kera* as in the case of wheat.

If you are not using fertilizer, the crop may be sown broadcast. After broadcasting the seed evenly, give a shallow ploughing followed by levelling.

Using a low seed-rate is bad economy. Use 10 to 12 kilograms of seed per acre.

Normally, no interculture is necessary for lentil crop. But if there are too many weeds, keep them down with a *khurpi*. This will help the crop grow properly and yield more.

In *barani* lands, no irrigation is possible. If, however, irrigation facilities are available, one to two light irrigations when the crop is at the flowering stage in the dry season are very useful.

But never irrigate this crop in early stages of its growth.

The crop takes about 3½ to 4 months to ripen. It is ready for harvest at the end of March or in the beginning of April.

Cut the plants near the ground level and carry them to the threshing floor. Stack, dry and thresh them by beating with sticks or by making the cattle tread over it.

After threshing, separate the grain and *bhusa* by hand-winnowers.

BABUL
IS A FARMERS' TREE

By M. L. N. IYENGAR
Farm Information Unit
Directorate of Extension, New Delhi

YOUR farm will be a complete farm only when you grow a few trees which can give you fuel and fodder, fruit and green manure. You can grow these trees in the field, on the bunds or along the farm border.

One of the very best trees you can grow is the *babul* (*Acacia arabica*: *kikar, babar, jali, nella tuma, karu velam*). It will be useful to you in many ways.

- *It will give you fuel;
- *its pods will be good feed for your cattle, sheep and goats;
- * its gum will find a ready market for use in dyeing cloth, in the preparation of sweets and in medicines;
- * it will yield a very hard and very durable wood for making cart-wheel hubs and agricultural implements.

WHERE TO GROW BABUL

You can grow *babul* in your field. It does neither throw much shade on the crop below nor do its roots go deep. Thus, it will not cause any damage to your crop.

You can also raise *babul* on bunds, borders or boundaries.

You can plant *babul* in groups in waste lands or in poor lands unfit for crops.

You can also grow *babul* as a hedge round your gardens.

Babul is good for growing in areas with low or medium rainfall. It is, however, not suitable for heavy rainfall regions. It can stand some amount of flooding and water-logging during rains; so you can plant them in low-lying areas of your farm. *Babul* can grow even in saline lands.

HOW TO RAISE BABUL

Babul does not stand transplanting well. You should, therefore, raise it by dibbling seeds.

Babul has a hard seed coat. Hence, to help the seed germinate easily, soak the seeds in water for 48 hours or you can also put them in boiling water, remove the vessel from over the fire immediately after,

and allow the water to cool. Take out the seeds after 24 hours and sow immediately before the seeds get dry. A better way of raising *babul* for you would be to plant seeds collected from sheep or cattle dung. You can feed cattle with *babul* pods and collect the seeds from the dung.

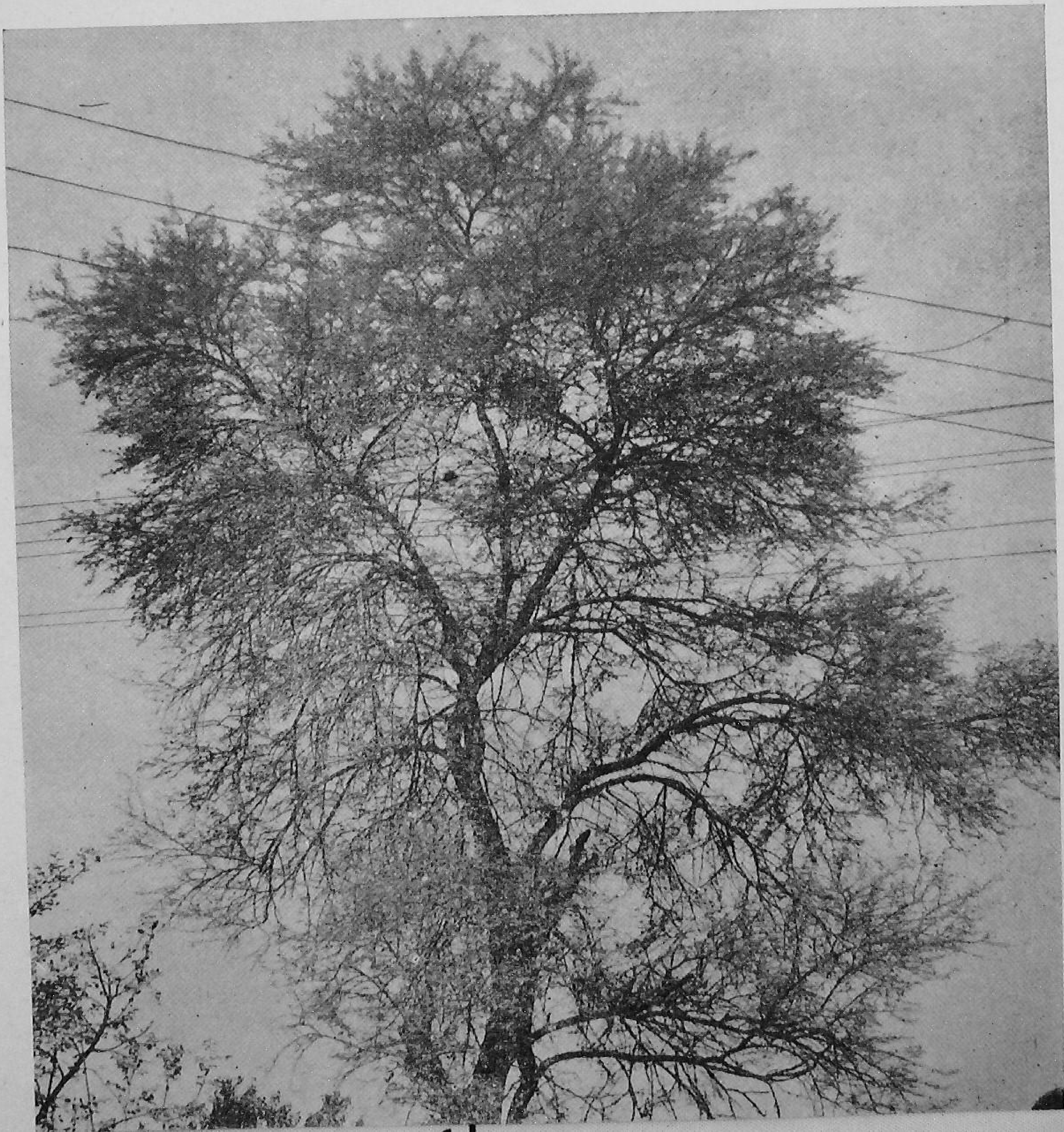
Dig pits about two feet deep, two feet long and two feet wide and expose the dug out soil for a few months.

If you want to plant *babul* on bunds or borders or in groups, dig pits 12 feet apart. Before sowing, mix some farmyard manure with the dug out soil. Then refill the pit to half the depth in a sloping manner.

Sow the seed in the centre of the pit after the rains.

In the first year, the plants grow to a height of three to four feet only. Keep the pit free from weeds and protect the young plants from goats, camels and rats.

Grow babul *anywhere in your field, or on bunds and borders, or as a hedge, or in waste lands*



HAVE YOU TRIED SITAPHAL IN YOUR HOME GARDEN ?

If not, plant a sapling today; you will be glad you did it.

By R. HALI
Editor, 'Kerala Karshakan'
Trivandrum

ONE good thing about *sitaphal* is that it needs the least care for growth and bearing. In fact, there is a common belief that '*sitaphal* fruits better when it is left to itself.'

But of course, if you wish to get the fruit by the basketfuls you have to give some attention to it.

You can grow it on the sea-shore as well as up to the height of 3,000 feet. It comes up well on any soil you choose to plant it in. But a word of caution: it does not like water-logging. Even then it can withstand a rainfall of 150 inches and also summer heat of about 103°F.

THE TIPS

See to it that you always choose a year-old seedling about one foot high for planting.

Prepare a pit one and a half feet square and fill it up with top-soil mixed with a basketful of well-rotten compost.

Plant the seedlings when you receive the rains.

The plant does not need any special planting space. A place close to the fence or hedge is good enough. Once a year, apply one basket of well-rotten cattle manure and a tinful of wood-ash till the fifth year. This will promote a quick and healthy growth of the plant.

The plant starts bearing fruits from the sixth year. The flowering commences in March and continues up to July. August to December is the harvesting period.

Apply two basketfuls of cattle manure (50 pounds) and two tinfuls (20 pounds) of wood-ash to the bearing plant. You will find that it will do a lot of good. Generally, 100 fruits can be expected from a plant but if you have manured it well, you can get as many as 400 to 500 fruits.

Pluck the fruits when the skin between the segments turns light yellow

Find out for yourself how delicious sitaphal *is* !

The best time to pluck the fruits is when light yellow colour appears on the skin between the segments. You can also pluck the fruits and then ripen them by keeping in straw or wood-ash.

So you see that all you have to do is to apply a little bit of manure once in a year to get these delicious fruits from your home garden. So, why not try it !

SIXTY per cent of the total expenses on keeping a poultry flock goes to cover the cost on feed alone. So if you want to economise on poultry keeping, you better start looking for some savings on feed-bill, but of course, not at the cost of efficiency.

Here is where groundnut cake comes handy. It is rich in proteins and is also freely available all the year round.

Proteins are very important in poultry feed for they go to make up about 1/5th of the weight of the living chicken. An egg contains about 12 per cent proteins while about 50 per cent of the dry matter of an egg is protein. Now usual sources of proteins are meat, fish, milk, etc. These are costly and what's more they may not be always available. Groundnut cake can be and is a good substitute for animal protein

Groundnut can help you save on POULTRY FEED

food. It is cheap, at the same time it is liked by birds and what is more contains good quality proteins.

But before including groundnut cake in your poultry feed you should know three important things.

One. Groundnut cake no doubt is a good protein feed but at the same time it lacks in certain things which are found only in animal foods. Therefore, let three-fourths of protein feed be made up of groundnut cake while meat, fish or milk products make up for the rest.

Two. Feed only decorticated groundnut, that is, the cake obtained by pressing the kernals of nuts after removing the hulls. The undecorticated cake is less digestible and should, therefore, not be used. Its fibre-content is also about four times that of the decorticated cake.

Three. Use only fresh and good quality cake. It should not be rancid, fermented, musty or mouldy or mixed with *mahua* or castor cake and husk, etc. It should also be of a firm texture.

By

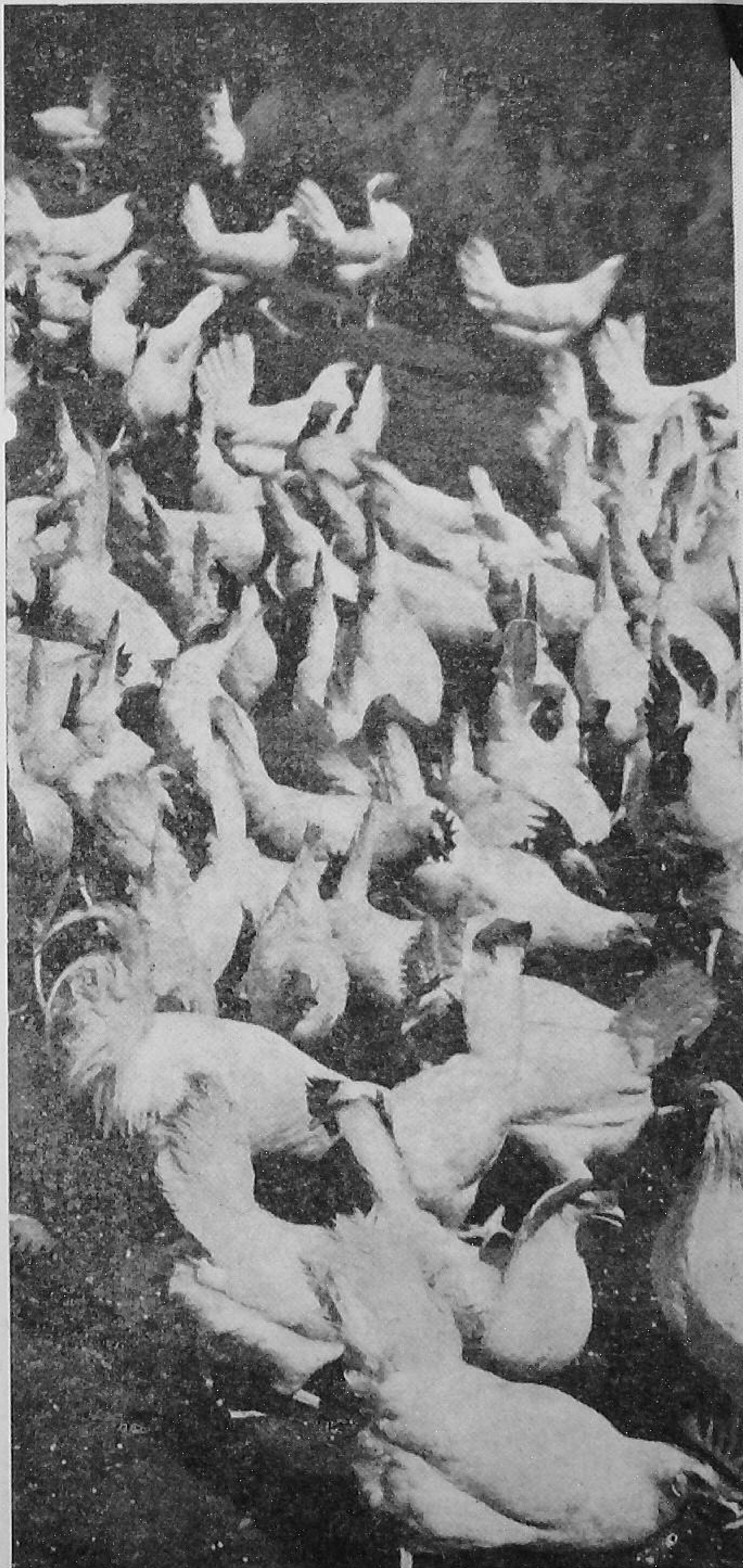
H. P. TANDON
Poultry Specialist
Directorate of Extension
New Delhi

See that the cake you feed is pure and not adultrated. The cake should taste like ordinary groundnut.

There is a method to find out whether the cake is pure or not. Mix a little of groundnut cake in a tumbler of clean water. The decorticated groundnut will make the water whitish while the presence of hull will make it brownish. The brown colour will vary according to the quantity of hull mixed.

This test alongwith your sense of taste and smell will help you select the pure cake.

If you are already feeding groundnut cake in your poultry, see that it is a pure decorticated one; if you have so far not included groundnut cake in the poultry feed, do it from now on.



AND NOW GAJRAJ

A grass that holds out promise of cheaper milk

DEVELOPED at the Poona Agricultural College and grown extensively on the farm of the National Dairy Research Institute, Karnal, *Gajraj* grass holds out promise of cheaper milk to everybody.

Just one acre of *Gajraj* can give 120 tons of fodder per year and provide the entire nutritional requirements of four cows yielding on an average four kilograms of milk everyday. No extra concentrate will be required to be fed to the cows. As such this now fodder grass will meet our need for cheaper milk production in the country.

Gajraj, a cross between Indian *bajra* and Australian Napier gets the name because of its height. It grows up to a 10 feet height when mature and has a long circular growth. Scientifically it is known as *Hybrid Napier—E.B. 4.*

You can grow *Gajraj* on any type of soil, excepting on stiff clay and water-logged fields. Clay loam is of course the best for this grass. It can stand to some extent alkaline and acidic soils. Under such conditions, it is more paying than even cash crops like sugarcane. It grows well in dry as well as in wet regions. But it cannot be grown at higher altitudes and in cold areas because intense cold and heavy frost are harmful to this grass.

HOW TO GROW THIS GRASS

Plough the land two to three times with an improved furrow plough. Spread uniformly seven to eight tons of farmyard manure with 200 kilograms of muriate of potash and 600 kilograms of super-phosphate an acre. To ensure that the fertilizer is thoroughly mixed with the soil, discing should be done.

Since *Gajraj* does not produce mature seeds, you have to propagate it from cuttings of mature stems and root-slips. You will require about 4 to 5 quintals of root-slips to plant an acre. Root-slips are just the tillers produced by the plant.

The monsoon, *i.e.*, from July to September/October is the best time for planting this grass. You can also plant it in the spring season provided you are sure of irrigation.

If you are planting in the rainy season, plant the crop on ridges. But if in the dry season, plant it in furrows. When the slips have taken root, take up earthing.

Plant the root-slips in rows three to four feet apart. In-between the root-slips, keep a distance of two feet.

You will find the crop ready for the first cutting two to three months after planting. Thereafter, you can take cuttings every month excepting during winter.

Weed the field and apply 100 kilograms of ammonium sulphate per acre after every cutting; follow it

Root-slips of Gajraj

Root-slips being sown

up with an irrigation immediately. A sewage irrigation is the best to get good growth and high yields. At the National Dairy Research Institute, Karnal, *Gajraj* has yielded 145.3 tons per acre in five cuttings. This is about four times the yield of Napier grass.

A word about harvesting. Do not allow *Gajraj* to over-mature. This will only make the grass less palatable.

You can feed the grass immediately after cutting to animals. Surplus fodder can be ensiled to make good silage.

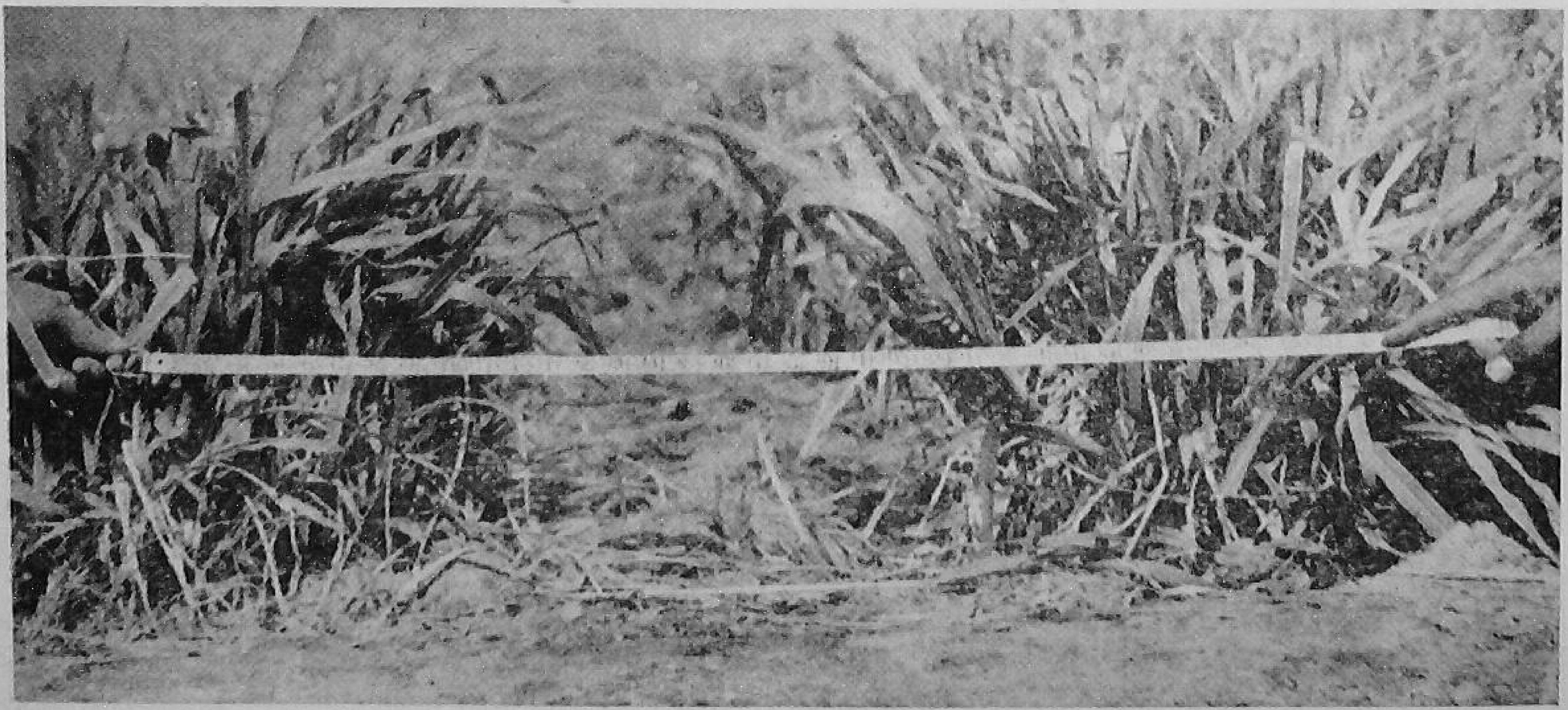
Gajraj is a highly nutritive grass with a protein-content of 6 per cent and energy-giving materials about 55 per cent. Nitrogen, calcium and phosphorus are also found in good quantities. This is one of the few fodder crops which can provide both nitrogen and phosphorus in correct amounts even when given as the sole feed.

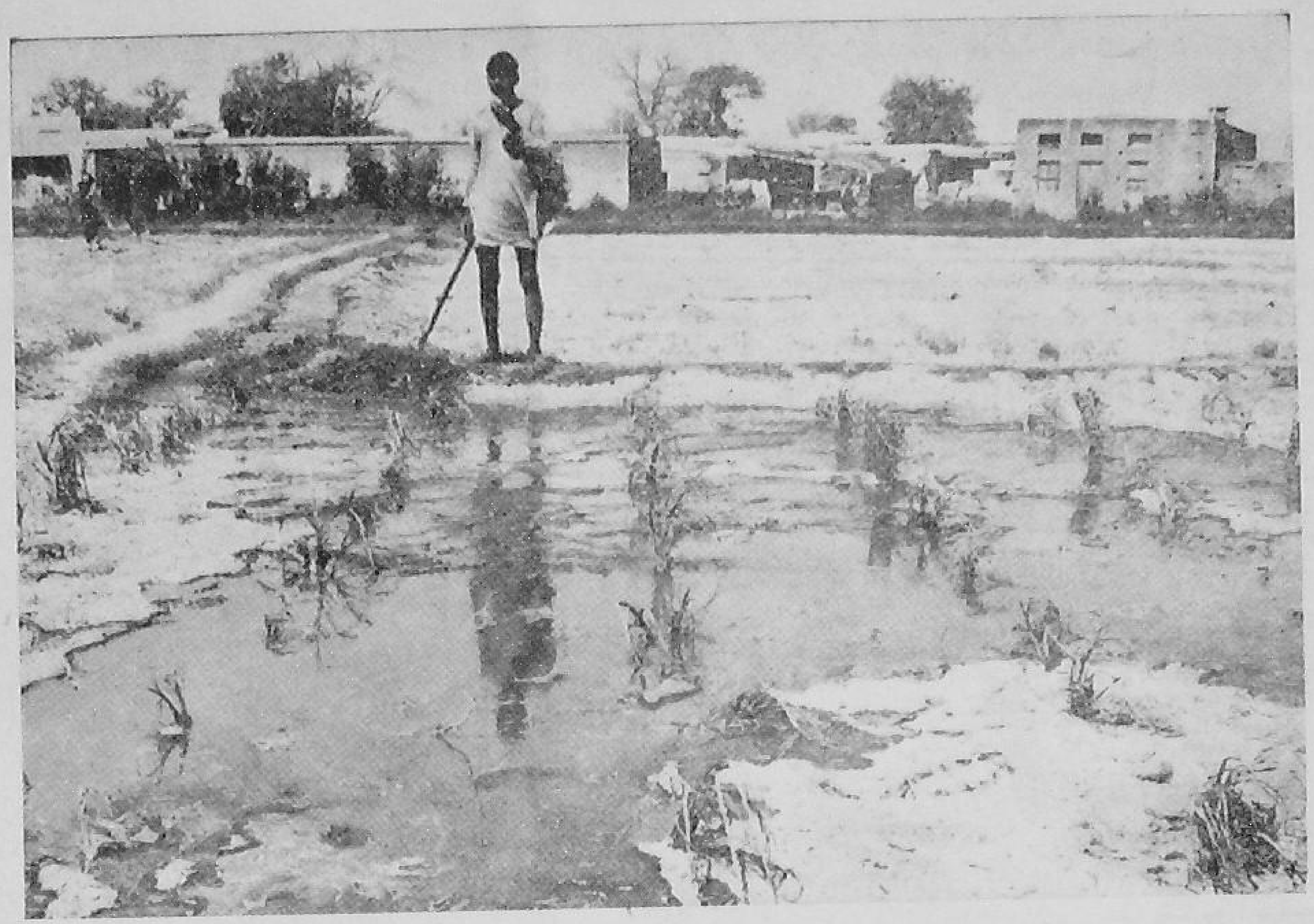
Adult cattle require 2.0 to 2.5 per cent of their body weight as dry matter in feed. It has been found that *Gajraj* alone can provide 1.6 per cent dry matter. The cattle when fed or kept on this fodder alone, maintain their body weight and general condition.

A field sown with slips

Comparing the total yield of nutrients per acre of various fodder grasses, it is seen that *Gajraj* gives the highest yield of 2.05 tons of digestible crude protein and

Root-slips sown two feet apart in lines





Irrigation should follow soon after sowing

17.5 tons of total digestible nutrients per acre. In comparison, berseem, which is a legume, gives only 0.36 ton of digestible crude protein and oats and Para grass 0.21 ton and 0.24 ton, respectively per acre.

Here, therefore, is a grass which has everything what one can expect from a high class grass: high yields, the availability almost all the year round, more nutritious and also more palatable.

A 20-day old crop

HOW KOTTARAPATTI DID AWAY WITH

By
R. VAIDYANATHAN
Commissioner, Panchayat Union,
Budalur, Madras

KOTTARAPATTI is a small village in the Budalur Panchayat Union of Package District of Thanjavur in Madras. The village with an area of 750 acres of irrigated land and 200 acres of dry land, has a population of 800.

This village had a bitter experience of rat trouble during March this year. The yield in most of the farms went down by 10 to 15 per cent, all because of rats. Farmers did try to do something to control this rat menace by catching and killing the rats by the bow-trap method. But this is a very slow and costly method. Farmers had to spend as much as 10 to 12 rupees per acre.

Then came the Intensive Agricultural District Programme in the area. One fine morning, the local Agricultural Extension Officer, accompanied by the Village Level Worker, visited the village and offered a new solution for the rat trouble. This was the use of zinc phosphide poison baits. But the Extension Officer also told the villagers that unless the whole village cooperated, the campaign will not succeed. The villagers were at first not fully responsive. They agreed half-heartedly to try out this method but the main difficulty was to find out a person who could take a lead and start this campaign.

A leader was soon found in a 19-year old 6-footer Arogyasami. He collected his friends and prepared a task force, 25 strong. This is how they began. They collected paddy grain and converted paddy into popped rice. They also collected funds from every villager at the rate of 25 nP. per acre. They took two hours each day to put the popped rice as pre-bait along the bunds for two days. On the third day, they completed placing poison baits all over the area in four hours.

Naturally, everyone in the village was anxious to know the results; more so were Arogyasami and his friends, for they had taken the trouble of collecting money, preparing the pre-baits and placing the poison baits. The day following, Arogyasami and his friends went out early in the field, but eagles and crows had preceded them and each one was flying away with one

dead rat. Even then, there were nearly 800 dead rats lying in various fields. On a modest estimate, the total catch was nearly 2,000 rats.

Thus, Arogyasami proved to farmers how self-help is the best help. If this could be done in the case of rat trouble, it could surely be done in the case of other problems also. Arogyasami is not satisfied with this one attempt only. He said all this would be repeated again when water is let into the fields.

The villagers sat down and calculated the economics of this rat campaign.

For baiting 200 acres

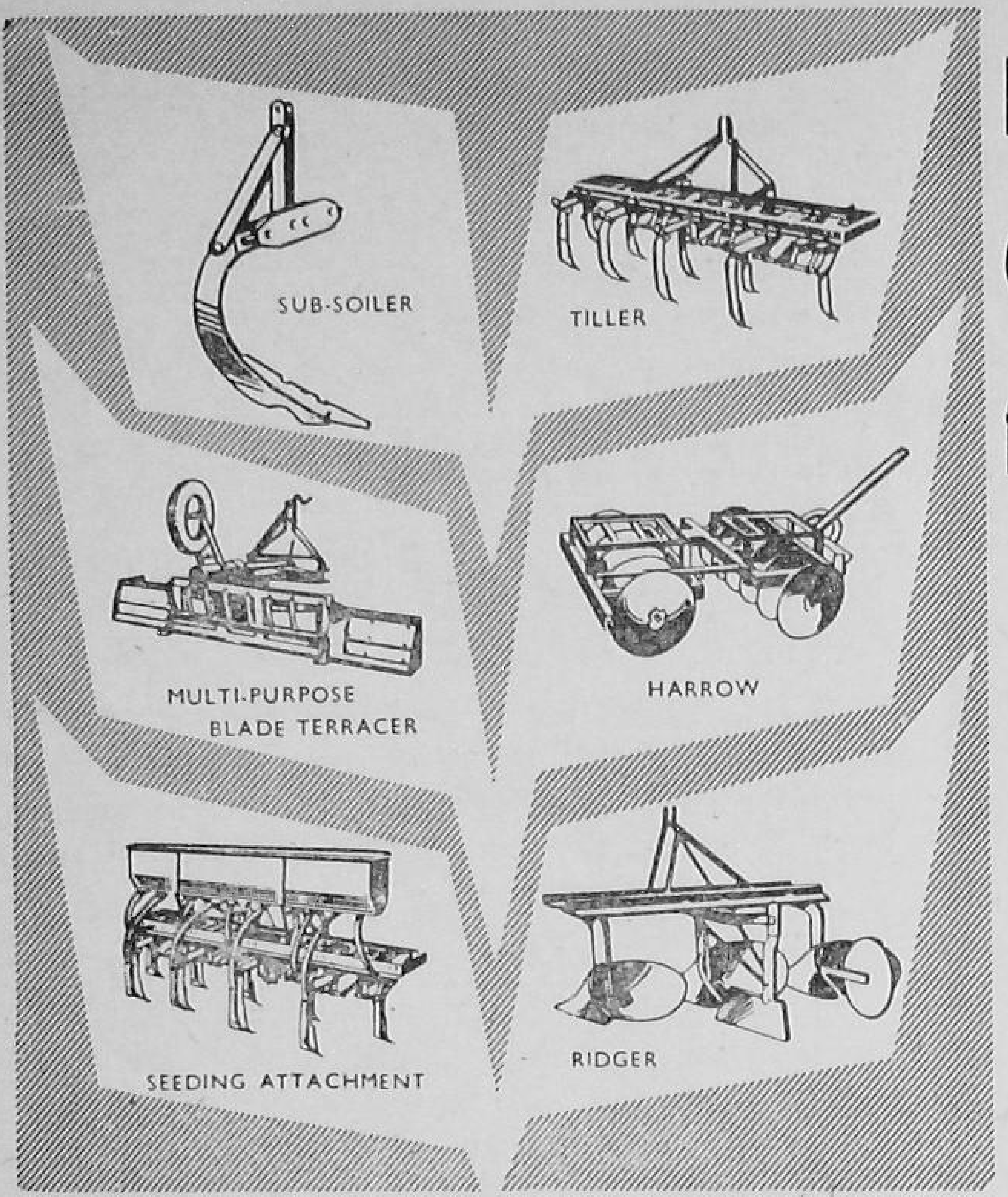
		Rs. nP.
Popped rice 4 bags at Rs. 7.50 nP.	. . . .	30.00
Coconut oil 3½ seers at 1·12 nP.	. . . .	4.00
¾ kg. zinc phosphide	. . . .	4.50
Contingencies and other charges	. . . .	1.50
Total	. . . .	40.00
Therefore, expenditure per acre	. . . .	0.20
For killing 800 rats actually seen	. . . .	40.00
For killing one rat	. . . .	0.05

Normally, when the crop is in the field, rat killers are paid 12 nP. per rat killed and Re. 1 as travelling allowance.

So, the method of poison baiting is not only more effective but also much cheaper.

Taking 12 nP. per rat and assuming that 10,000 rats would be killed, the saving to a village works out to Rs. 1,200. This is quite a big sum. No wonder the villagers are thankful to these volunteers and the Package Programme.

Villagers placing poisoned baits on field bunds



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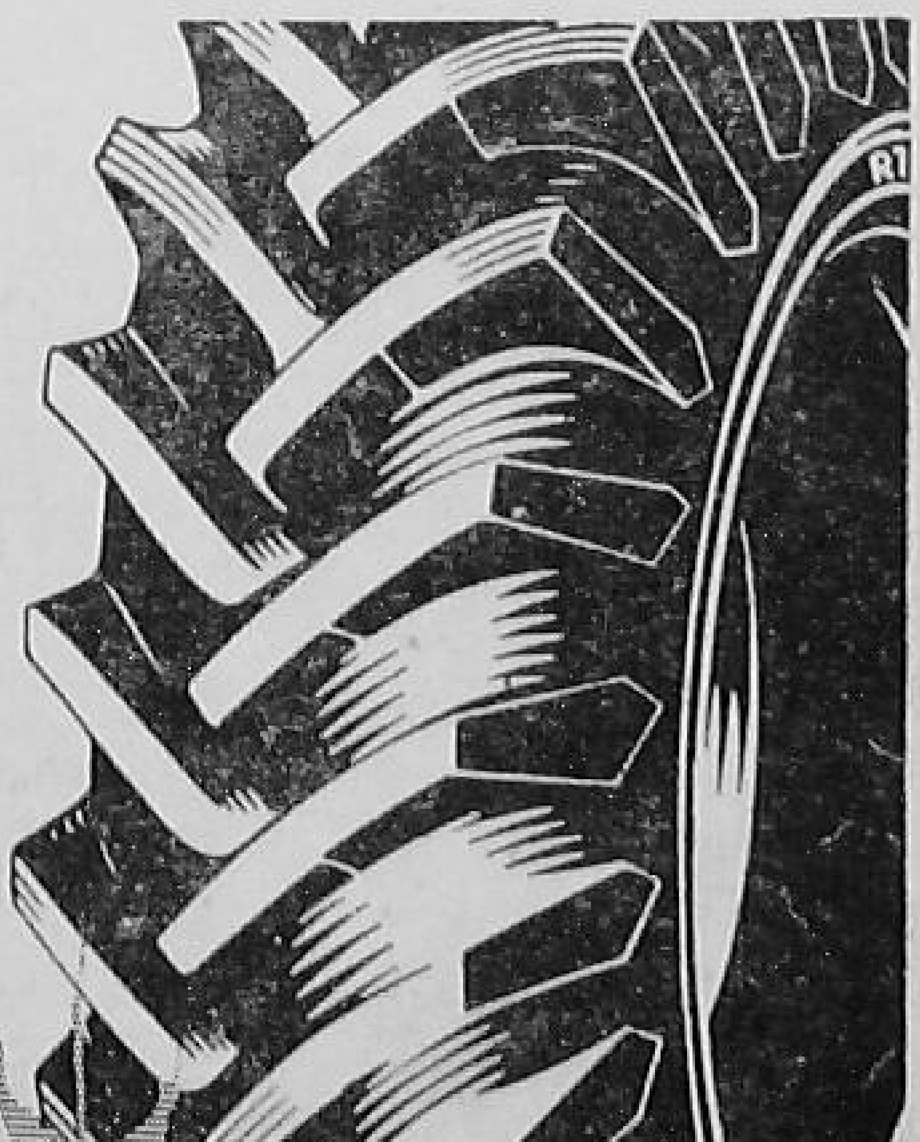

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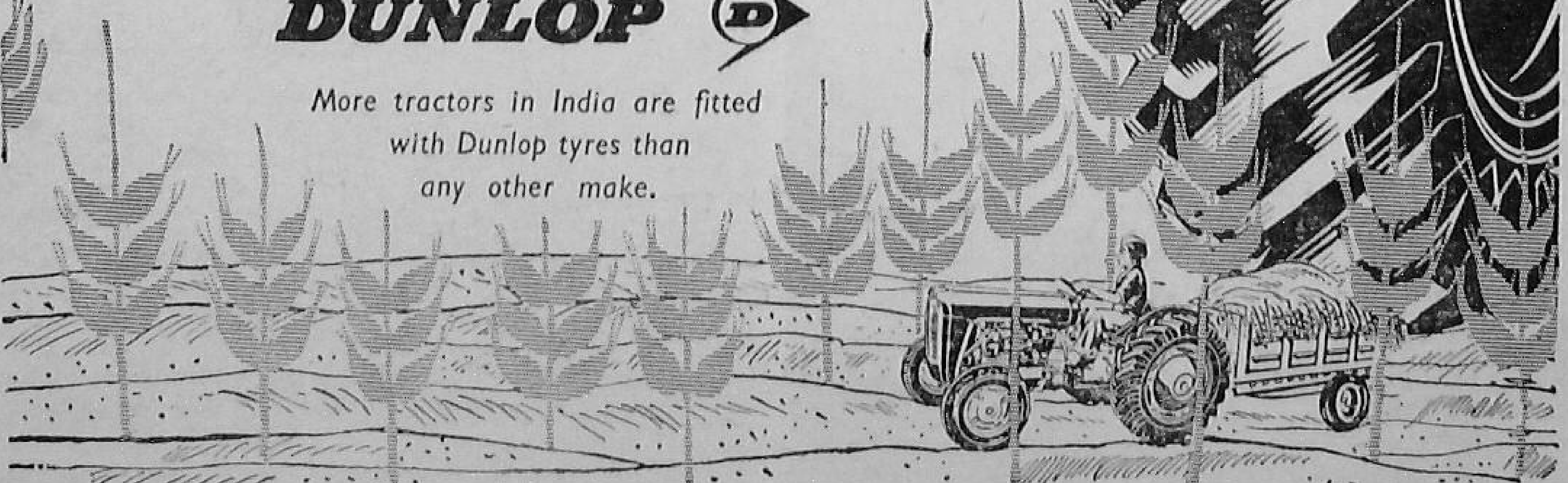

DTC-15B

New Pulses for the Punjab

... that promise to bring handsome profits to Punjab farmers

By
S. GURCHARAN SINGH, Economic Botanist, Jullundur
and
S. AVTAR SINGH, Wheat Breeder, Gurdaspur

TILL now, pulses, though a must in the daily Punjabi diet, have not been considered important enough by Punjab farmers. This is mainly because of their low yields.

And this is the reason why they are grown either mixed with crops like maize, *bajra, chari,* wheat and barley, or are grown in poor fields. There is yet another reason why Punjab farmers are not very fond of growing pulses. This is due to the fact that pulses are very sensitive to agro-climatic conditions. Even a slight change in weather, because of a little less or more rain than what is required, has an adverse effect on the yield.

But this does not mean that yields of pulses are very low in the Punjab. In fact, they are the highest in the country. Still, there is a vast scope to increase the yields by sowing seeds of improved varieties.

Here are four such improved varieties which promise better returns to Punjab pulse growers.

Mash 1-1.

The plant is of a spreading variety with a fairly large number of branches. All its parts are hairy.

Mash 1-1 is fairly tolerant to adverse weather conditions and is also resistent to virus and fungus diseases.

Its leaves are non-serrated and roundish in shape. The pods are medium-sized and have thick white hairs on the surface.

The grains are fairly bold and have an attractive black colour. They cook well, mix well, leave no hard grains and develop a good taste.

Its average yield is 1,960 kilograms per acre as against 985 kilograms of mash *No. 48*.

Mash 1-1 is good for growing in the plains of the Punjab, particularly in the submontane and humid tracts of the State where fungus diseases take a heavy toll of mash crop.

Kulu Mash No. 4.

This is single plant selection from an indigenous variety of Kulu Valley of Kangra District. These plants are semi-spreading and bushy type with good many branches.

It is resistant to fungal diseases. The leaves are almost similar to those of *mash 1-1* and are thickly hairy. The pods are plump and are fairly long and have thick tufts of dirty white hair on the surface.

The grains are quite bold and have a dirty black colour. They mix well on cooking, leave behind no hard grains (*kokaru*) and possess a good taste.

In trials conducted at Kulu and Katrain in Kangra District, it gave an average yield of about 310 kilograms as against 265 kilograms per acre of local Kulu mash.

It is recommended for growing in the hilly tracts of the State where the annual rainfall is about 150 cm. or less.

Shining Mung No. 1.

This is a selection from *China mung*. Its plants are dwarf and erect with branches spreading parallel to the ground level.

It is resistant to fungal diseases. Its leaves are more or less oval-shaped triples on a stalk and are

somewhat light in colour. There are practically no hairs on the surface.

The pods are fairly long. The grains are bold, practically double the size of the local *mung* and are of shining and light in colour. It matures in about two to two and a half months and does well on lands of average fertility and under mild climatic conditions.

In trials conducted at Kulu and Katrian of District Kangra, it yielded about 290 kilograms per acre as against 72 kilograms of local Kulu mung.

It is recommended for cultivation in the hills where rainfall is about 150 cms. or less. It does well in the plains also, particularly in the submontane and central zones of the State, if sown at the end of March or in the first week of April, when it ripens at the end of May or in the beginning of June.

Lentil 9-12.

It is a selection from a local commercial variety of the State. Its plants grow erect. The plants branch profusely and bear a good many pods.

The grains are typically brown in colour and are comparatively bolder than those of the local commercial variety.

The grains cook and mix with water easily and are tasty to eat. There are no hard grains.

It gave an average yield of 342 kilograms per acre as against 312 kilograms of the local lentil in the trials conducted at Gurdaspur and Jullundur. It is recommended for all over the State wherever lentil crop can be grown.

COTTON LEAF ROLLER ENDRIN CONTROLS IT

The cotton leaf roller, one of the serious pests of cotton, can be effectively controlled by spraying endrin on the crop. This is also found to be the most economical method of control at the Institute of Agriculture, Anand, Gujarat State.

To spray an acre of cotton crop, 50 gallons of 0.01 per cent endrin solution is found sufficient. One such spraying is enough to control the cotton leaf roller. The spraying protects the crop against aphids and jassids, which are also serious pests of the corp.

The cost of spraying an acre of cotton crop comes to about Rs. 6.75 which includes both the cost of insecticide and labour charges.

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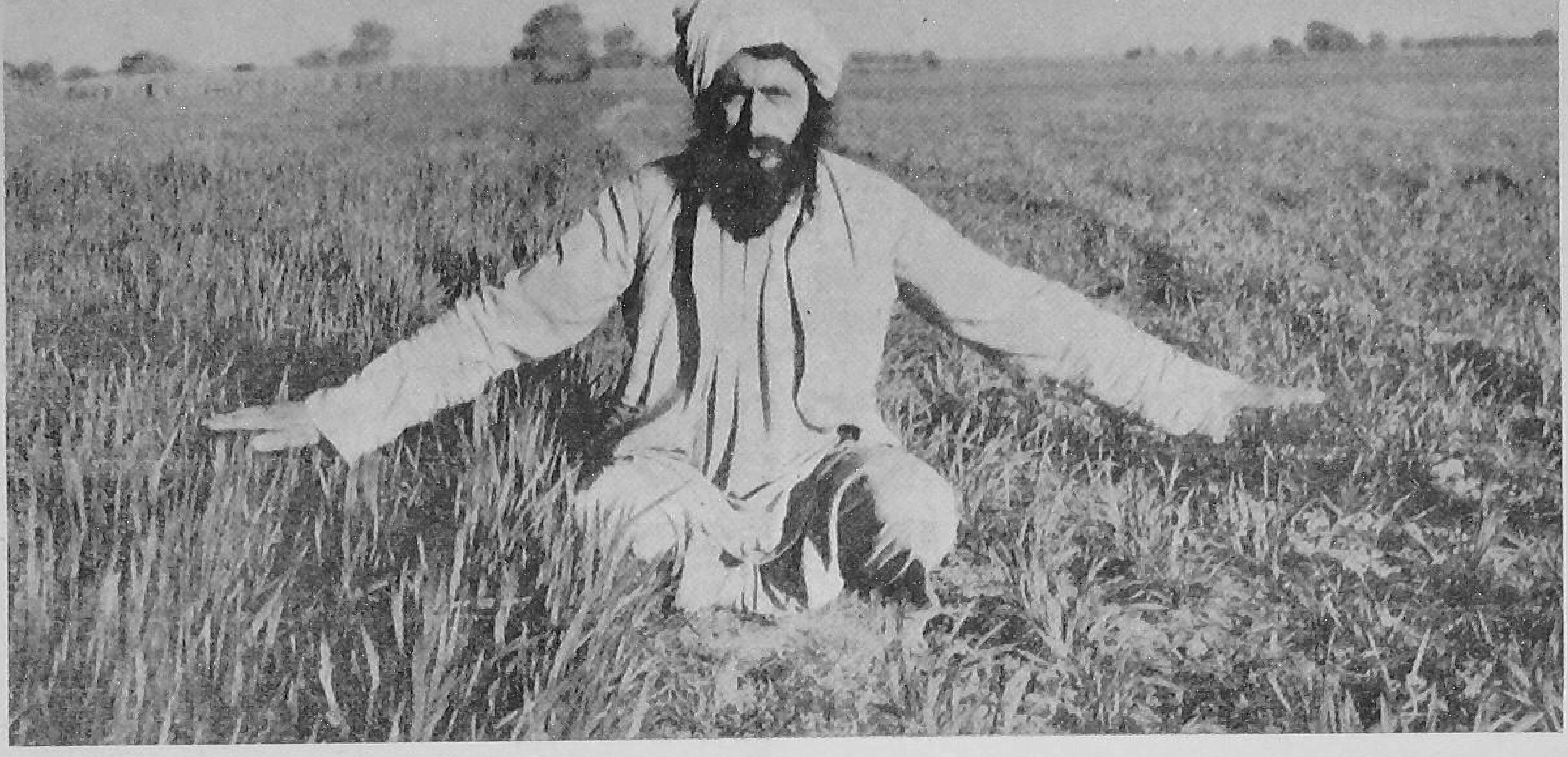

THE I.A.D.P., THE FARM PLAN AND BACHAN SINGH

Here is yet one more story of what IADP has achieved in the district of Ludhiana in the Punjab

SARDAR Bachan Singh of village Jodhan is one of the farmers who have learnt what a farm plan can do in raising the yields to a high level. Bachan Singh was able to increase his sale of the produce from Rs. 5,170 to Rs. 10,105 within a period of one year alone—1961-62. During 1962-63, he created a new record in his area by producing 30 maunds per acre on an average on a 12-acre plot. On one field of 4 acres, he produced even as much as 38 maunds per acre.

Let us see how the farm planning helped him get such high yields. He did the sowing on 20th October, 1962. He used the recommended wheat variety—*C-273*, using the seed-rate of 37 kilograms per acre He, of course, got his seed requirement from the Government Seed Farms. He treated the seed against the bunt disease with 'Agrosan'.

He placed the seed at a depth of seven to eight inches between the lines. He did his sowing by *kera* method and drilled the fertilizers below the seed. All these practices were recommended in the farm plan which was drawn up by the Extension Workers in consultation with him.

As regards the fertilizers, he used one quintal of calcium ammonium nitrate, one quintal of phosphate and 25 kilograms of muriate of potash per acre.

The soil on which Bachan Singh grew his wheat crop was washed away during the floods in the previous *kharif* season. The soil is also sandy loam. In spite of this fact, he succeeded in raising a very successful wheat crop by following the package of recommendations given in the farm plan.

Bachan Singh's total expenditure on following the package of practices recommended in the farm plan including the cost of seed came to Rs. 82 per acre, whereas he earned Rs. 690 per acre from the sale of wheat and *bhusa*.

Many other farmers in the District have also taken up the package of practices and are raising bumper wheat crops. An yield of 55 maunds of wheat is now not very uncommon in this District.

Bachan Singh, like most of our farmers, was very reluctant in trying out any of the practices given in the farm plans, specially those which involved extra expenditure; for example getting improved seed, treating them and applying fertilizers. But he along with other farmers saw with their own eyes the result demonstrations arranged by Extension workers, where they were explained the necessity for sowing the right seed in the right way and the need for applying fertilizers, and what likely effect all these have on the income of the farmers.

In Ludhiana, now about 60 per cent of the farms are covered by farm plans and the results can be easily seen in rapid increases in the crop production in this District.

'PACKAGE PROGRAMME' FOR DELHI

The Intensive Agricultural District Programme, popularly known as Package Programme, will shortly be introduced in the Union Territory of Delhi. Here are some interesting facts on agriculture in Delhi and what Package Programme aims at achieving

WITH an area of about 570 sq. miles, Delhi has nearly 60 per cent or 2.17 lakhs acre available for cultivation. By the end of the Third Five Year Plan, the cultivated area may be reduced to about 1.90 lakhs acres on account of progressive urbanization.

Grain is the dominating crop under the existing pattern of agriculture in Delhi, with merely 10 per cent of the cultivated area being utilized for cash crops like fruits and vegetables and about 7 per cent for fodder.

In view of the large urban population and the large consumption of milk, vegetables and fruits in the city, the present agricultural pattern is unsatisfactory in relation to the needs of the area, and large quantities of fruits, vegetables and milk have to be imported into the city.

As much as 40 per cent of the cultivated area in Delhi is irrigated; it is expected to increase further. It should, therefore, be possible to rationalize the pattern of agriculture by giving fruits and vegetable cultivation and mixed farming their due place. Besides, raising the living standard of farmers in the area, this would also help relieve the pressure on transport caused by the need for importing these requirements.

WHAT THE PACKAGE PROGRAMME AIMS AT

The Programme aims at careful planning of production programme and supply of credit on the basis of farm plans prepared for individual holdings; improving supply of production requisites, *e.g.*, improved seeds, fertilizers and manures, pesticides, improved implements, etc.; providing technical guidance in adequate measures through considerable increase in trained staff at the field level; strengthening of co-operative credit for ensuring adequate and timely supply of credit; ensuring marketing and other services through co-operatives so that the farmers get a fuller value of their produce.

WHAT AREAS IT WILL COVER

The Package Programme will cover three of the five development Blocks, namely, Alipur, Najafgarh and Mehrauli, covering about 200 villages with about 50,000 farming families. The Kanjhawala Block is not being included in this Programme, because the Indian Agricultural Research Institute is already operating an intensive extension programme in this Block. Shahdra Block is not being taken up as flooding and water-logging affect large areas in this Block, thus making it unsuitable for intensive farming effort without taking up long-range measures such as drainage, flood control and irrigation.

THE TARGETS TO BE ACHIEVED

The original target for additional area to be brought under irrigation during the Third Five Year Plan was 7,000 acres. Under the Package Programme

it has been raised to 14,000 acres, through 45 tube-wells, 100 pumping sets and 100 wells.

The production of cereals in Delhi at the beginning of the Second Five Year Plan was about 45,000 tons. It is proposed to increase it to about 75,000 tons through the increase in the distribution of fertilizers from 1,000 tons to 2,700 tons, seeds from 10,000 to 14,000 maunds. Ten trucks are being added to the existing 16 for distributing sludge to cultivators.

At present about 13,000 acres of land are under various vegetable crops. It is proposed to raise the area under vegetable to about 21,000 acres. There are already arrangements for supply of seeds in all the Blocks. Now emphasis will be laid on obtaining more and better seeds for vegetables and multiplying them at the Alipur Farm.

There is also more provision for loans for purchase of milch cattle. Three cattle-breeding centres are being opened for upgrading the stock. It is proposed to increase milk production from 2 lakh maunds per year at present to about 3.60 lakh maunds by 1965-66.

The Government Poultry Farm, Delhi Cantonment, will be expanded and the breeding stock increased from 4,000 layers to about 10,000 layers. The annual production of chicks at the Farm now is about 50,000. This will be raised to about 1.10 lakhs chicks. The egg production will similarly increase from 4 lakhs to 10 lakhs per year.

In the field of fisheries also, it is proposed to double the annual production to about 5,000 maunds in the first phase. After the completion of the bund which is being constructed on the Najafgarh Jheel, the fish production will be intensified to yield about 30,000 maunds of additional fish per annum in the second phase.

All the farmers participating in the Programme who have a production plan would be given adequate agricultural credit required through cooperatives. There will be intensive supervision to ensure that the credit is spent on the production plans.

The Reserve Bank of India will be fully associated with the Programme and will provide additional financial assistance to the cooperative societies through cooperative banks.

THE MACHINERY TO IMPLEMENT THE PROGRAMME

The Development Department of the Delhi Administration working in close collaboration with the Directorate of Extension in the Ministry of Food and Agriculture will be responsible for implementing the Programme. There will be staff over and above the normal complement at the various levels to implement the Programme.

At the Block level, additional staff including 10 Gram Sevaks, 3 Extension Officers will function under the Development Commissioner who will ensure the necessary coordination with the various other departments of Delhi Administration concerned with the Programme.

The Director of Farm Advisory Unit of the Directorate of Extension, Ministry of Food and Agriculture, would function as the Project Director for this programme and the various subject-matter specialists in the Directorate would provide technical guidance and advice.

BENCH MARK SURVEY AND ASSIGNMENTS

A comprehensive survey will be undertaken to study the status of agricultural development in the territory at the start of the Programme, to collect the basic data on the agro-economic structure of the territory. Such a survey will provide base-line data on the resources of farmers, from which production plans could be formulated and also the progress from season to season assessed.

Scientific demonstration will be the most important method by which farmers will be motivated to adopt improved farming techniques. The composite demonstrations, covering all the recommended practices, will be laid out in fields of farmers selected in consultation with the panchayats.

A schedule of improved practices for each production activity for particular areas or situations will be drawn up, and each Gram Sevak as well as the expert staff will lay a number of composite demonstrations in each season.

The Programme will be taken up for implementation from the *rabi* season of 1963-64, and for the remaining period of the Third Five Year Plan, a tentative provision of about 13 lakhs has been made for staff, transport, demonstrations and publicity. Schemes costing 43 lakhs have been prepared to intensify the programmes of animal husbandry, poultry and vegetable production.

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HE MADE THE MOST OF HIS LAND

By D. MUTHUSWAMY
Farm Information Unit
Directorate of Extension
New Delhi

HOW much land does a farmer with a small family need? If you had met Yakub Khan of Thirumangalakudi, Tanjore District, you would have straightaway said, "not more than an acre and a half."

Yakub Khan has just an acre and a half of wetland and a little less than an acre of dryland.

He is lucky to have these lands just fifty yards from his house. Except for this inherited piece of luck, Yakub Khan has greater trust in hard work than in luck for success in farming.

HIS FIRST SUCCESS

Seeing that he could not add to his acres any further, he made up his mind to make the most of his one and a half acres. He had been getting 2,500 pounds of paddy every year. Unless he found a way to get more paddy, he was sure he and his family would not be able to live comfortably.

He, therefore, started to improve his land and farming methods. He devoted personal attention to ploughing, selection of seed, sowing, transplanting, adding fertilizers, weeding and spraying. Gradually he found that if he could not increase the area he could certainly improve the yield. In 1955-56 he won the District Prize for raising 5,002 pounds of paddy per acre.

PACKAGE BRINGS BENEFITS

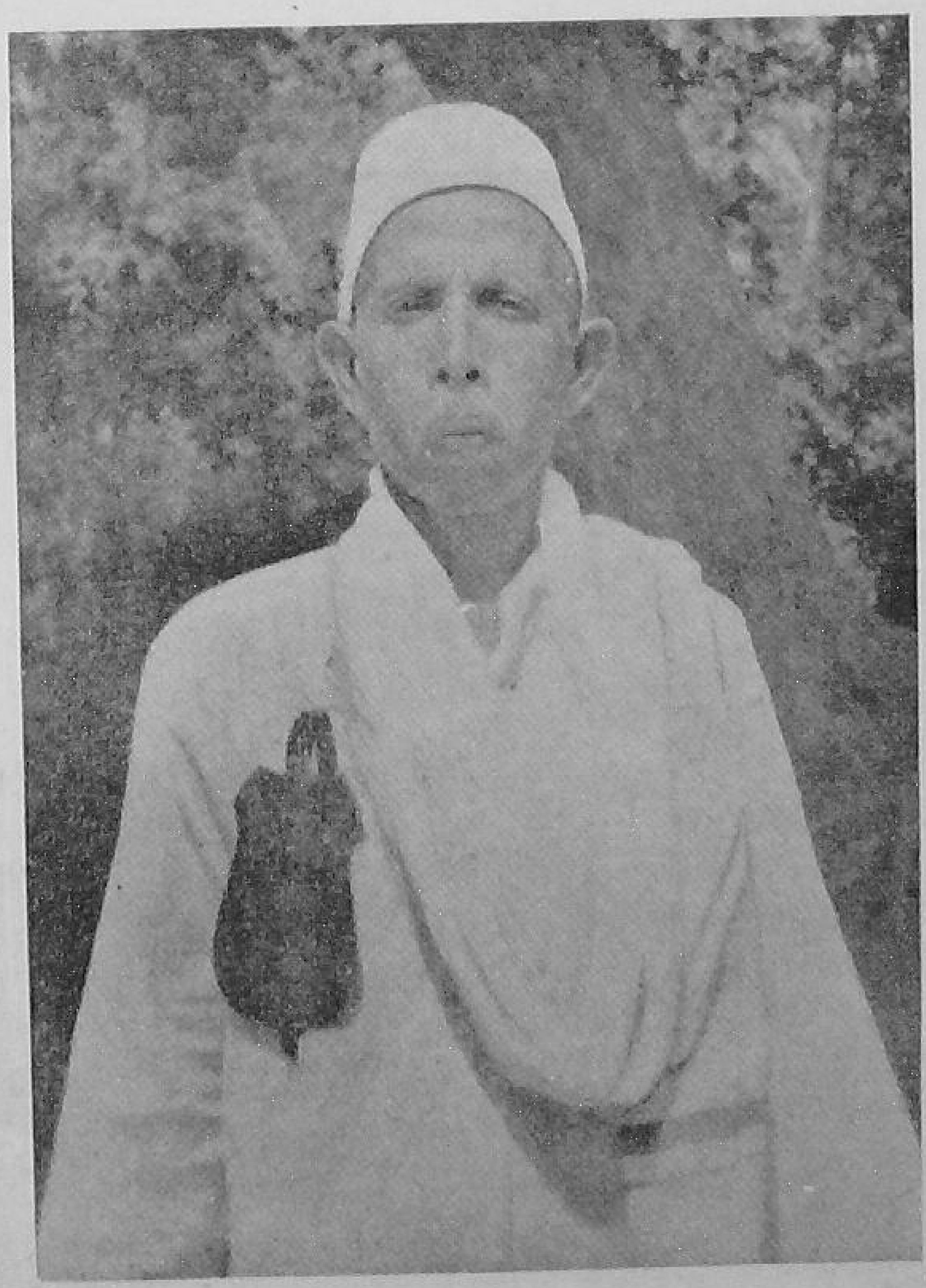
When the Package Programme came to Tanjore District, Yakub Khan saw in it the hope of realizing his desire of bettering his yields further. He contacted the Package Programme officials, prepared the necessary farm plan and lost no time in starting work the 'package' way in dead earnest.

His yields increased. When I visited the field with the District Agricultural Officer, Kumbakonam, Thanjavur District, *Co-30 thaladi* crop, a veritable 6,000 pounder, was a sight to see. The crop was uniform, ears well-filled, there was no lodging and no disease. "Pests were definitely outlawed," according to Yakub.

"Though I have not had much of school education, I always believed in scientific methods. The Extension and Agricultural Officers were prompt and earnest in giving me help. I am now a happier man than what I was a few years ago," said Yakub Khan.

The following is his cropping method for *thaladi* paddy.

Yakub Khan the successful farmer who won the District Medal for growing 5,002 pounds of paddy per acre in 1955-56



SEED-BED

He prepares the seed-bed, giving it a light ploughing. Deep ploughing of seed-bed, according to him, results in deep rooting. Such roots get damaged at the time of transplanting. He adds sesbania or glyricidia leaves to the seed-bed and always treats the seed with chemicals before sowing. He adopts a seed-rate of 25 pounds per acre.

PREPARATION OF FIELD

After the harvest of the previous short crop (*kuruvai*), he ploughs the land and floods the field. The water is allowed to stand for two days. He gives two ploughings and adds 5,000 pounds per acre of green manure. He then fills up the field with water and allows it to stand for seven days.

TRANSPLANTING

The day previous to transplanting he gives two ploughings to the field. At the time of transplanting he adds 150 pounds of superphosphate and ploughs once. He transplants in rows at intervals of nine inches between rows and six inches between plants.

CULTURAL OPERATIONS

Top-dressing with ammonium sulphate is done once after the first weeding, *i.e.*, 20 days after transplanting, and once when ears start setting.

He always uses pesticides, DDT 5 per cent and BHC 10 per cent after the first weeding and 'Folidol' at the second weeding. He obtains the sprayers from the extension officials.

YIELD

"The present crop is due to be harvested in about 20 days. I estimate it will yield about 6,000 pounds definitely," opined the DAO, when we went round the field.

HIS GARDEN

"What about your garden?" I asked Yakub, I take good care of my trees also and I get coconut, bananas, Mangoes and guavas, and above all the green manure for my field.

The mango blossoms showed promise of a rich harvest. The coconut bunches were well set.

I congratulated the farmer for making the most of his little piece of land and for his enthusiasm to raise a better and still better crop of paddy.

Yakub Khan discusses his problems with an Extension official

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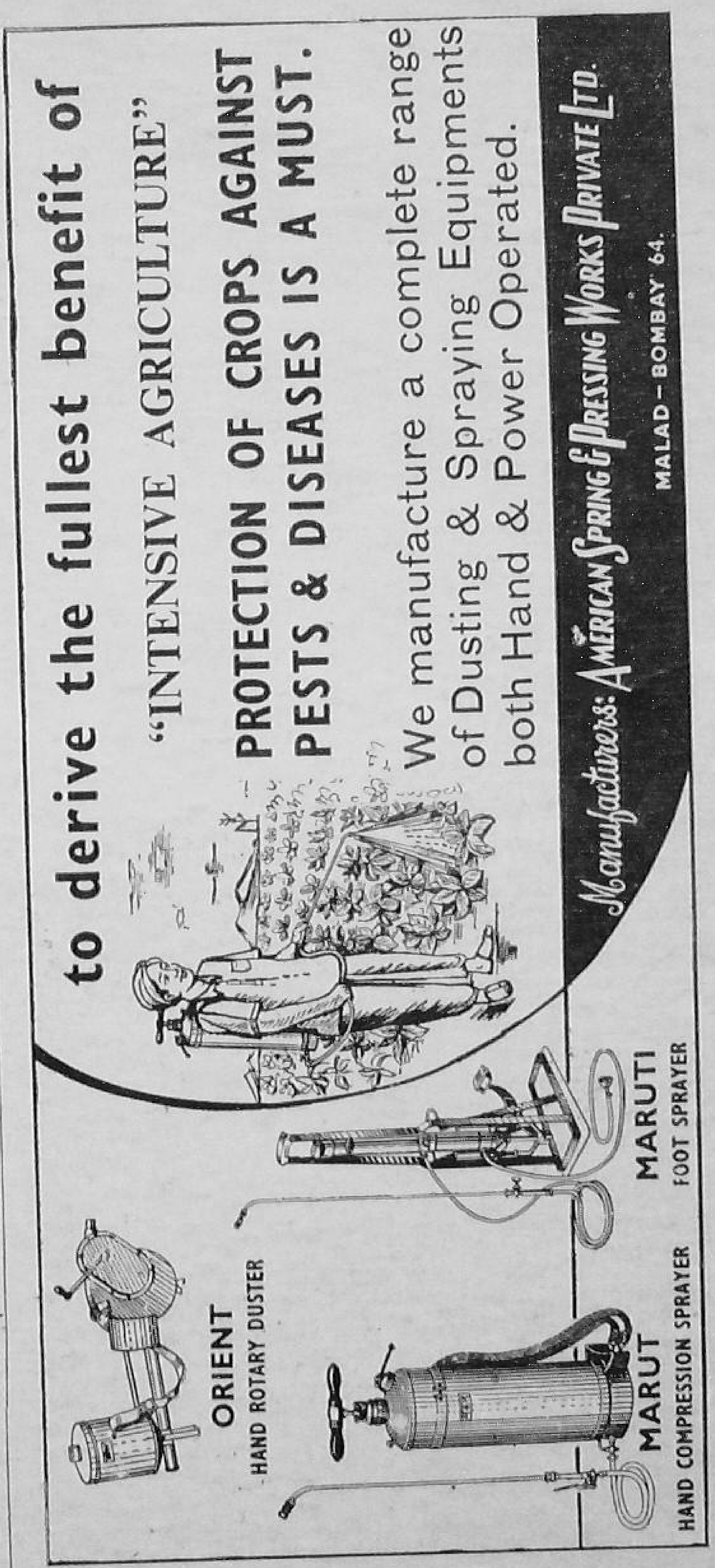

CORRECTIONS

- In the May '63 issue of INTENSIVE AGRICULTURE, authors of the article 'Nothing like producing your own vegetable seed' are from the Division of Horticulture, I.A.R.I,. New Delhi.
- In the same issue, the article 'Our top cotton state gets package deal' was written by G. S. Deepak and A. S. Sandhu.

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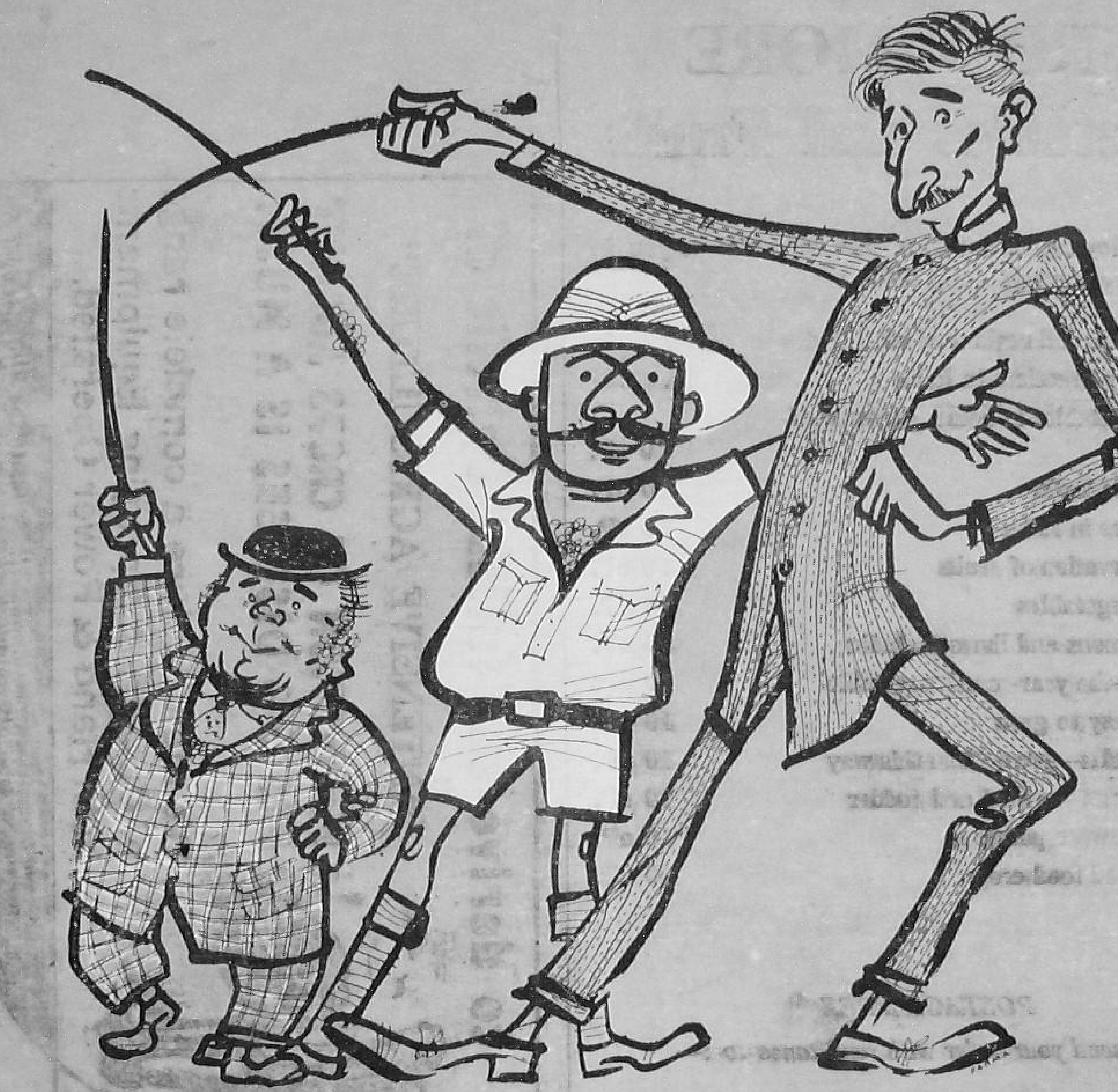

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